Napa County
Groundwater Monitoring Plan 2012

presentation for

Napa County
Groundwater Resources
Advisory Committee

by
Vicki Kretsinger Grabert

Luhdorff & Scalmanini,
Consulting Engineers

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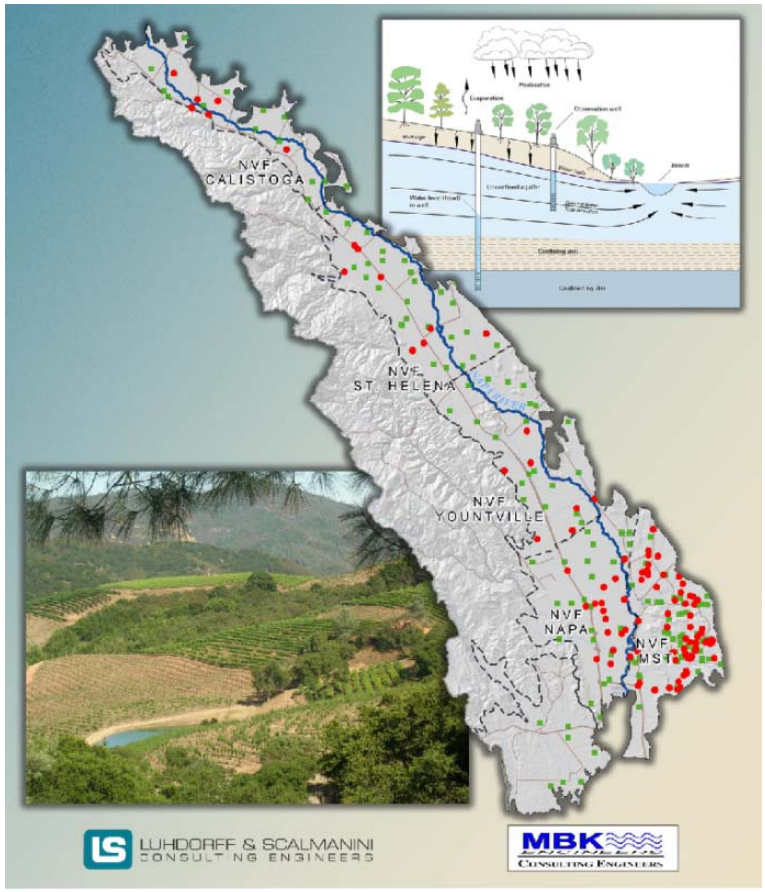
Agenda Item 5B

Presentation Overview

- GW Monitoring Plan
  - Revisions to Draft Plan
- Groundwater Levels
  - Objectives & Priorities
  - Areas of Interest
- Groundwater Quality
  - Objectives & Priorities
  - Areas of Interest
- Next Steps
  - Potential Volunteered Wells in AOIs



Groundwater Monitoring Plan 2012

- **Draft Sections 1-3, June 2012**
- **Draft Sections 1-6 plus Appendices, August 2012**
- **Final Draft Plan with Revisions**
  - Clarifying tables and acronyms
  - Groundwater balance
  - Localized WQ issues/interests
  - Streamlining of Section 5

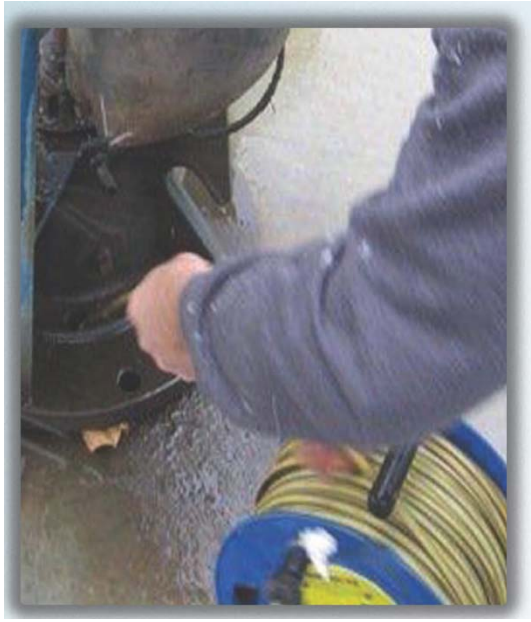
GW Level and Quality Monitoring Objectives

Overall Objectives

- Address data gaps: provide infill, replacement, and/or project-specific monitoring as needed
- Coordinate with other entities on collection and incorporation of GW quality data in the DMS
- Coordinate monitoring with County water resources goals

GW Level Monitoring Objectives

- Improve understanding of trends, & factors related to trends
- Improve understanding of GW occurrence & movement
- Further evaluate SW/GW interaction
- GW conditions, including local and regional water supply availability & reliability



Groundwater Balance

***Inflows* – *Outflows* = ΔS**

Change in GW Storage

Inflows

- Precipitation;
- SW inflow & infiltration;
- Intentional recharge (ponds, ditches, etc.);
- Applied water, net recharge (e.g., irrigation);
- Unintentional recharge (leaky pipelines);
- Subsurface inflows from outside basin.

Outflows

- GW extraction by wells;
- GW discharge to SW/springs;
- Evapotranspiration; and
- Subsurface outflow from basin.

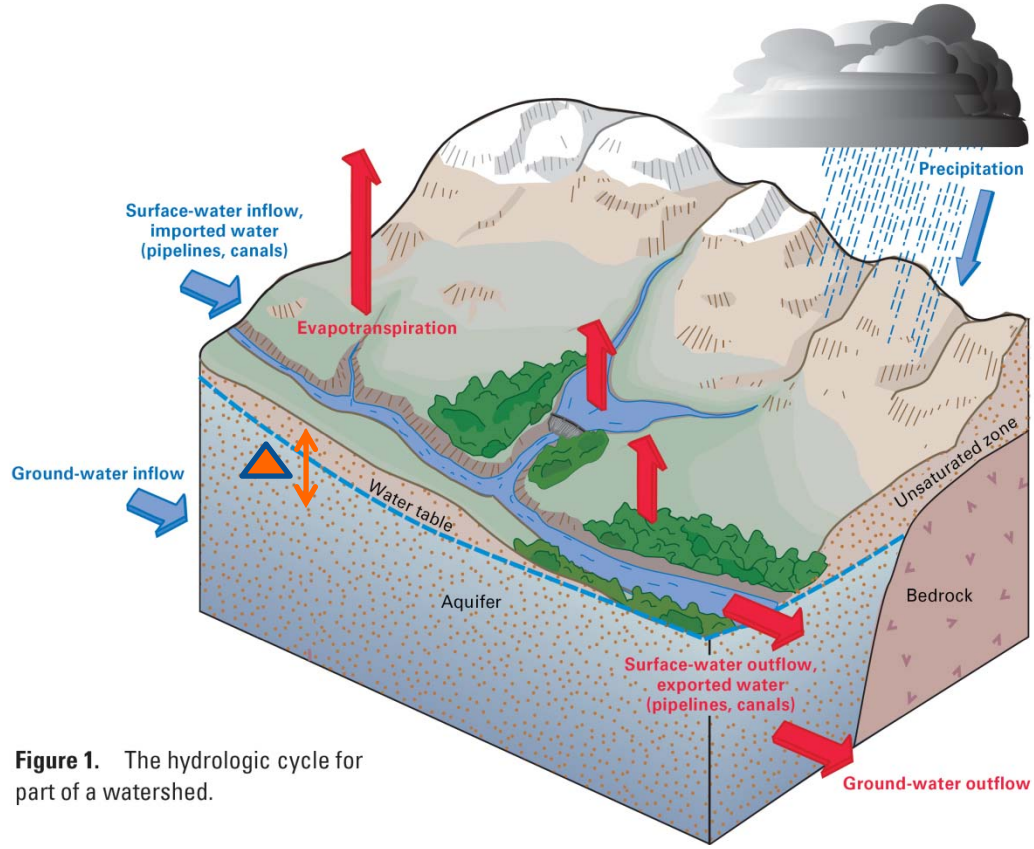


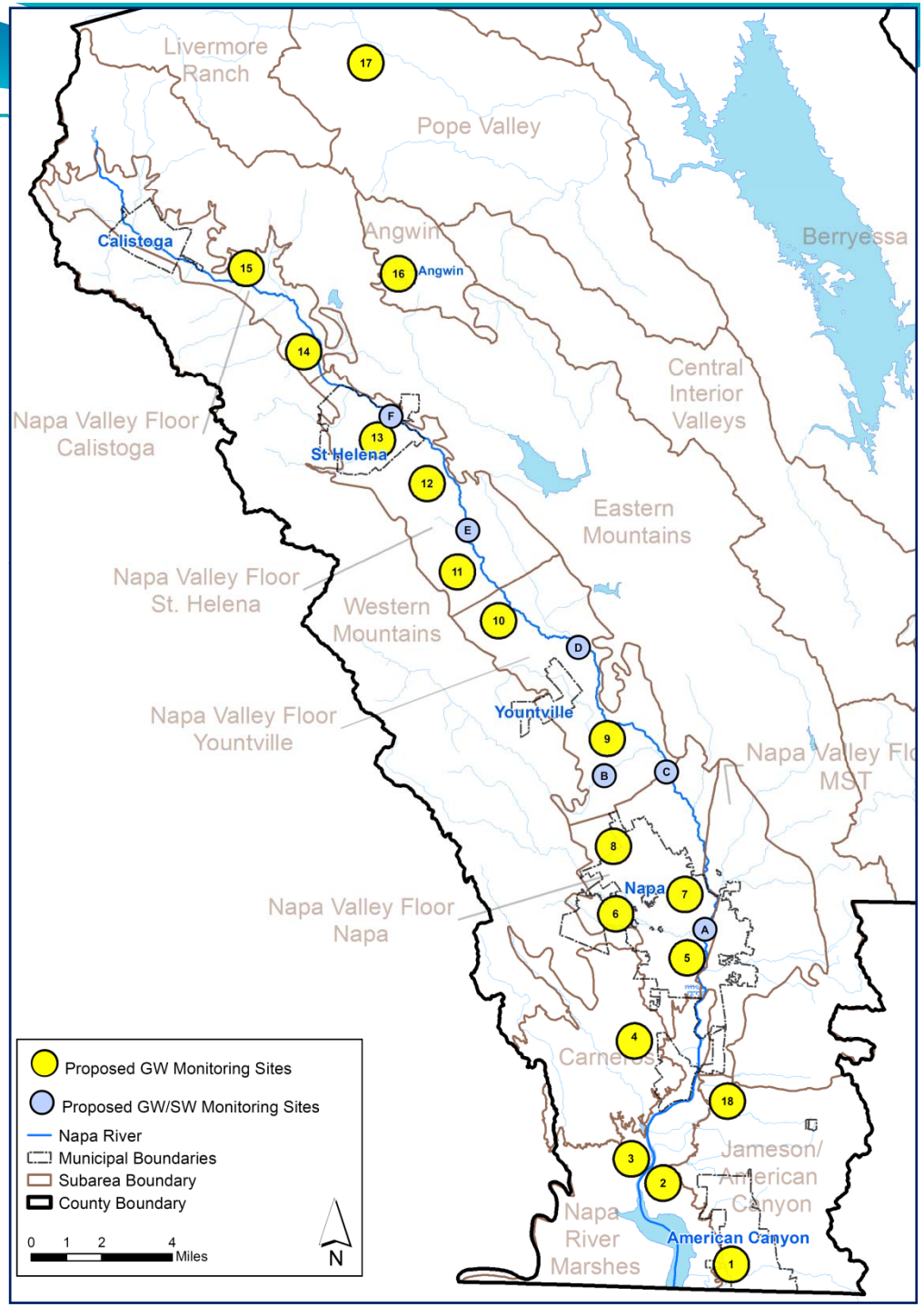
Figure 1. The hydrologic cycle for part of a watershed.

Modified from USGS Circular 1308

GW Monitoring: Recommended Areas of Interest (AOIs)

- ⑤ ***18 addn'l areas proposed for GW level & quality monitoring***

- © ***6 addn'l areas proposed for evaluation of SW/GW interaction***



GW Level Monitoring:

Priorities, Objectives, Recommendations

Subarea	No. Sites with Current Ground-water Level Data	Future GW Level Monitoring (Relative Priority)		Monitoring Needs	Recommend Addn'l Sites[2] (Number of Areas of Interest; Additional Volunteered Sites)	Proposed Areas of Interest for Monitoring	Key Monitoring Objectives[3]
Napa Valley Floor-Calistoga	**6**	**H**	**E**	**SP, SW**	**2 AOIs; V**	**14, 15**	**Conditions, Trends, Wtr Budget, SW**
Napa Valley Floor-MST	**28**	**H**	**R**	**SP, SW**	**V**		**Conditions, Trends, Wtr Budget, SW**
Napa Valley Floor-Napa	**19**	**H**	**R**	**SP, SW**	**2 SW; 4 AOIs; V**	**5, 6, 7, 8**	**Conditions, Trends, Wtr Budget, SW**
Napa Valley Floor-St. Helena[4]	**7**	**H**	**E**	**SP, SW**	**2 SW; 3AOIs; V**	**11, 12, 13**	**Conditions, Trends, Wtr Budget, SW**
Napa Valley Floor-Yountville	**8**	**H**	**E**	**SP, SW**	**2 SW; 2 AOIs; V**	**9, 10**	**Conditions, Trends, Wtr Budget, SW**
Carneros	**5**	**H**	**E**	**B**	**1 AOI; V**	**4**	**Conditions, Trends, Wtr Budget, Saltwater**
Jameson/American Canyon	1	M	E	B	3 AOIs; V	1, 18	Conditions, Trends, Wtr Budget, Saltwater
Napa River Marshes	1	M	E	SP, SW	1 AOI; V	2, 3	Conditions, Trends, Wtr Budget, Saltwater
Angwin	0	M	E	B	1 AOI; V	16	Conditions, Trends, Wtr Budget
Berryessa	3	L	E	B	V		Conditions, Trends (includ. CASGEM)
Central Interior Valleys	1	L	E	B	V		Conditions, Trends
Eastern Mountains	0	L	E	B	V		Conditions, Trends
Knoxville	1	L	E	B	V		Conditions, Trends
Livermore Ranch	0	L	E	B	V		Conditions, Trends
Pope Valley	1	L	E	B	1 AOI; V	17	Conditions, Trends (includ. CASGEM)
Southern Interior Valleys	0	L	E	B	V		Conditions, Trends
Western Mountains	0	L	E	B	V		Conditions, Trends
Total	**81**				**6 SW; 18 AOIs; V**		

(from Table 4-1)

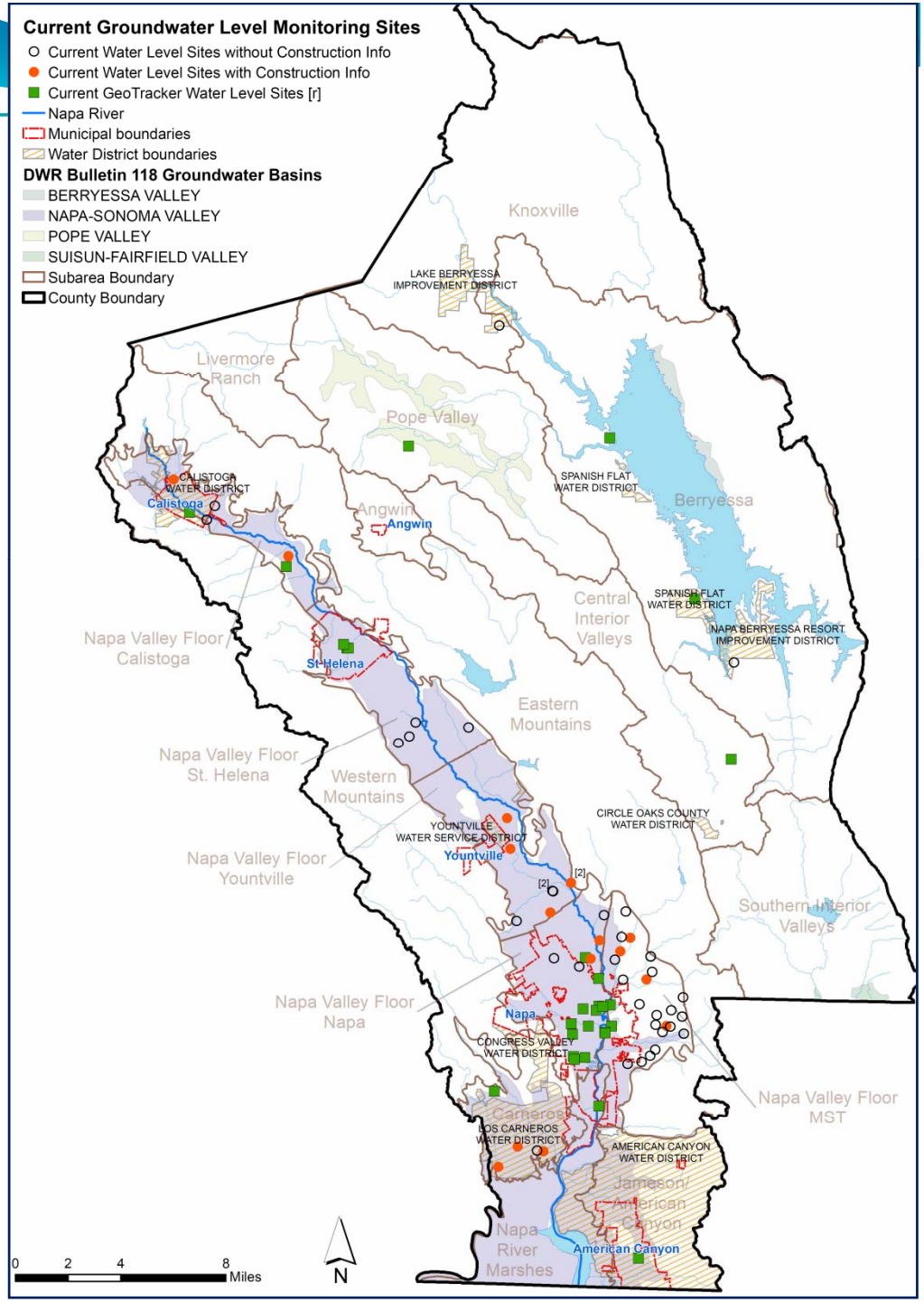
Example:
Volunteered wells of interest in **two (2) Areas of Interest (#14 and #15)** in Calistoga Subarea, and also other **Volunteered** wells as suitable

GW Levels: Priority Subareas

- **NVF- Calistoga (E,SP,SW)**
- **NVF- St. Helena (E,SP,SW)**
- **NVF- Yountville (E,SP,SW)**
- **NVF- Napa (R,SP,SW)**
- **NVF- MST (R,SP,SW)**
- **Carneros (E,B)**

81 Current Sites

E= Expand; R= Refine
SP= Spatial Coverage; SW= SW/GW Interaction; B= Baseline

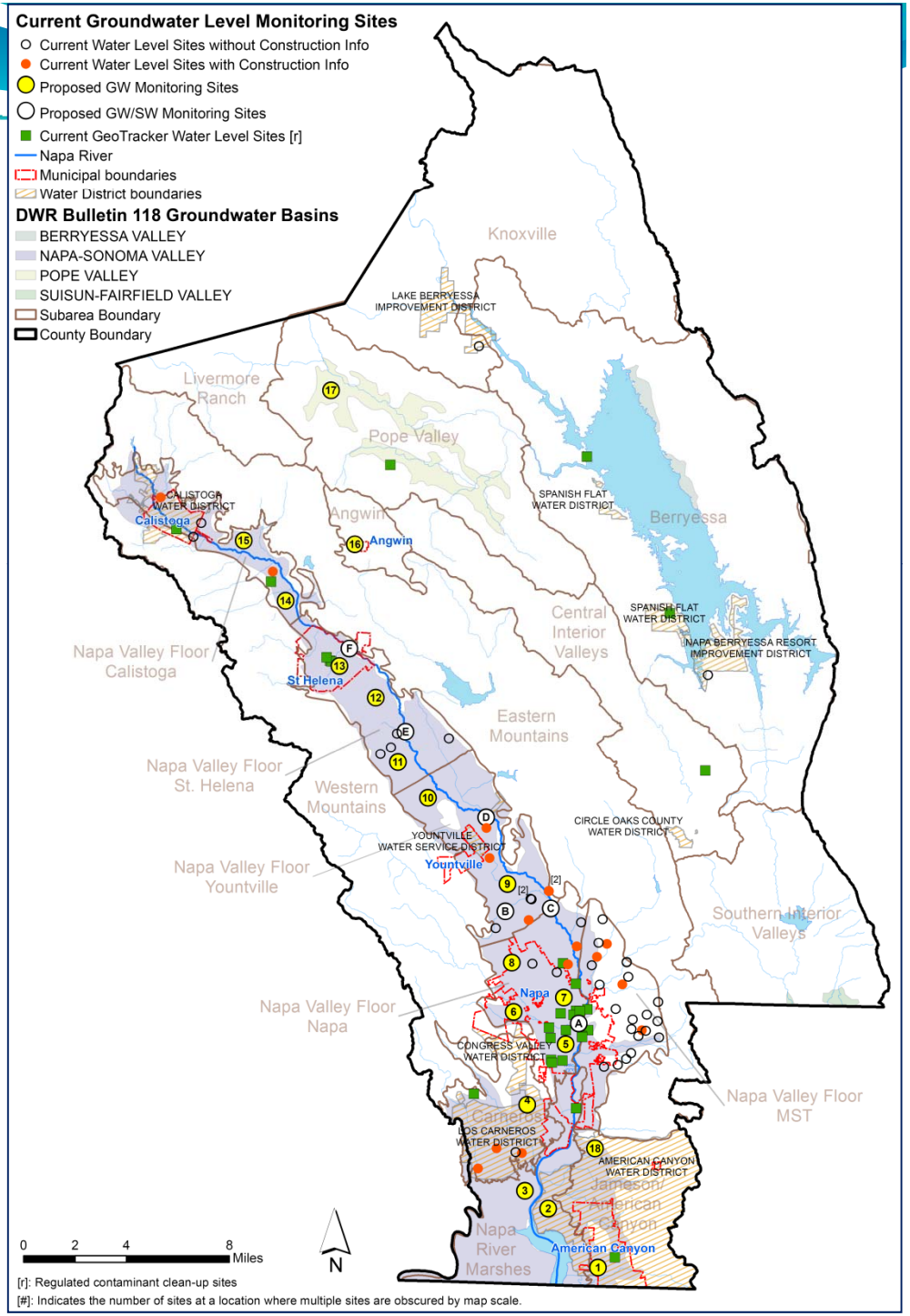


GW Level Monitoring: Current & Recommended

- Data Gaps
- GW Conditions
- Trends
- Water Budget
- SW/GW Interaction

⑤ *18 addn'l areas proposed for GW level monitoring*

Ⓒ *6 addn'l areas proposed for evaluation of SW/GW interaction*



GW Quality Monitoring Objectives

- Assess changes & trends in GW quality, and corresponding factors for changes
- Evaluate GW quality conditions in Subareas; differences in WQ spatially between areas & vertically within a Subarea
- Establish baseline conditions in areas of potential saltwater intrusion (e.g., Carneros, Jameson/American Canyon and Napa River Marshes Subareas)
- Detect the occurrence of & factors attributable to natural (e.g., general minerals and trace metals) or other constituents

GW Quality Monitoring:
Priorities, Objectives, Recommendations

Subarea	No. Sites with Current GW Quality Data	Future GW Quality Monitoring (Relative Priority)		Monitoring Needs	Recommend Addn'l Sites[2] (Number of Areas of Interest; Additional Volunteered Sites)	Proposed Areas of Interest for Monitoring	Key Monitoring Objectives[3]
Napa Valley Floor-Calistoga	20	M	R	SP,C	2 AOIs; V	14, 15	Conditions, Trends, Nat'l Constituents
Napa Valley Floor-MST	**16**	**H**	**R**	**SP,C**	**V**		Conditions Trends, Nat'l Constituents
Napa Valley Floor-Napa	21	M	R	SP,C	2 SW; 4 AOIs; V	5, 6, 7, 8	Conditions, Trends, Nat'l Constituents
Napa Valley Floor-St. Helena	31	M	R	SP,C	2 SW; 3 AOIs; V	11, 12, 13	Conditions, Trends, Nat'l Constituents
Napa Valley Floor-Yountville	14	M	R	SP,C	2 SW; 2 AOIs; V	9, 10	Conditions, Trends, Nat'l Constituents
Carneros	**9**	**H**	**R**	**SP,C**	**1 AOI; V**	**4**	Conditions, Trends, Nat'l Constituents, Saltwater
Jameson/American Canyon	**3**	**H**	**E**	**B,SP,C**	**3 AOIs; V**	**1, 18**	Conditions, Trends, Nat'l Constituents, Saltwater
Napa River Marshes	6	M	E	B,SP,C	1 AOI; V	2, 3	Conditions, Trends, Nat'l Constituents. Saltwater
Angwin	4	M	E	B,C	1 AOI; V	16	Conditions, Trends, Nat'l Constituents
Berryessa	6	L	E	B,C	V		Conditions, Trends, Nat'l Constituents

(from Table 4-2)

GW Quality Monitoring:
Priorities, Objectives, Recommendations

Subarea	No. Sites with Current GW Quality Data	Future GW Quality Monitoring (Relative Priority)		Monitoring Needs	Recommend Addn'l Sites[2] (Number of Areas of Interest; Additional Volunteered Sites)	Proposed Areas of Interest for Monitoring	Key Monitoring Objectives[3]
Central Interior Valleys	6	L	R	B,SP,C	V		Conditions, Trends, Nat'l Constituents
Eastern Mountains	25	M	E	B,C	V		Conditions, Trends, Nat'l Constituents
Knoxville	0	L	E	B,C	V		Conditions, Trends, Nat'l Constituents
Livermore Ranch	0	L	E	B,C	V		Conditions, Trends, Nat'l Constituents
Pope Valley	6	L	E	B,C	1 AOI; V	17	Conditions, Trends, Nat'l Constituents
Southern Interior Valleys	0	L	E	B,C	V		Conditions, Trends, Nat'l Constituents
Western Mountains	10	L	R	B,C	V		Conditions, Trends, Nat'l Constituents
Total	**177**				**6 SW; 18 AOIs; V**		

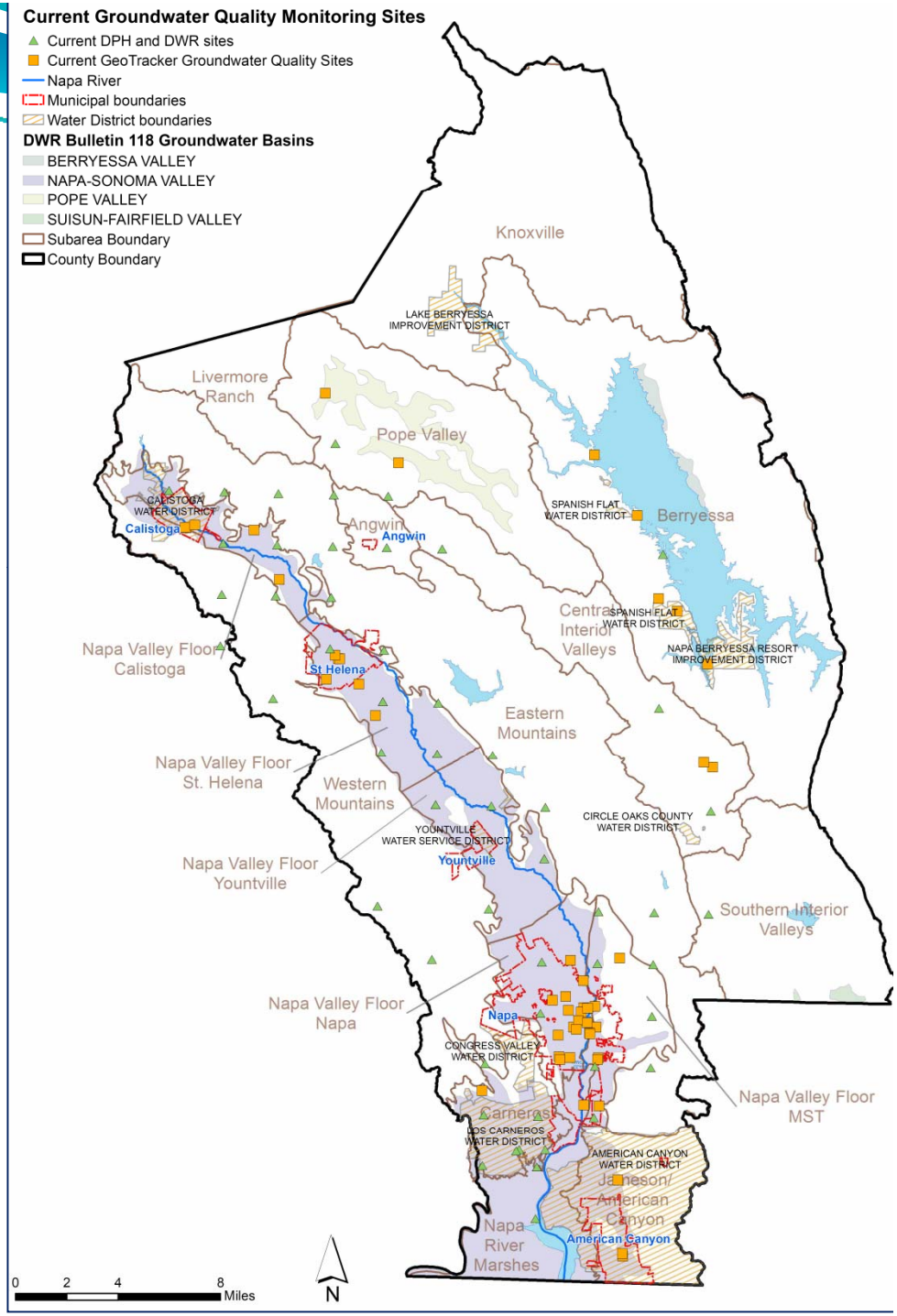
GW Quality: Priority Subareas

- **NVF-MST (R,SP)**
- **Carneros (R,SP)**
- **Jameson/American Canyon (E,B,SP)**

➢ **Coordinate w/GW Level Monitoring**

177 Current Sites

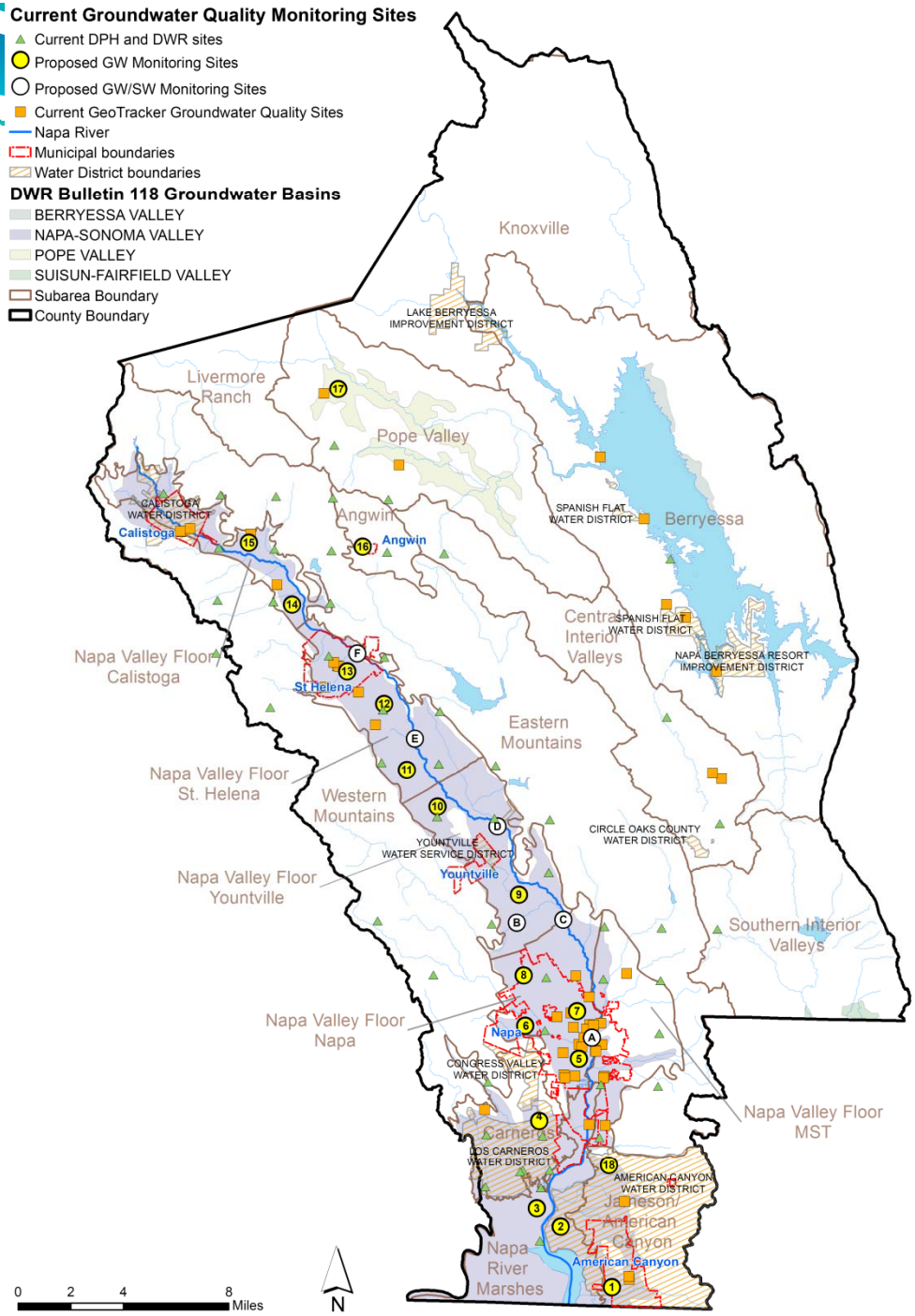
E= Expand; R= Refine
SP= Spatial Coverage; B= Baseline



GW Quality Monitoring: Current & Recommended

- **Conditions**
- **Trends**
- **Natural Constituents**
- **Saltwater**

Recommended GW Quality sites coordinated w/areas proposed for addn'l GW level monitoring (18 ●,6 ●)



GW Quality Parameters

- **Baseline (Initial Sampling Event)**
  - General Minerals: EC, TDS, pH, Na, K, Mg, Ca, Cl, SO4, NO3, F, Alkalinity, Hardness
  - Metals: Ag, Al, As, B, Ba, Be, Cd, Cr, Hex Cr, Cu, Fe, Hg, Mn, Ni, Pb, Sb, Se, Tl, V, Zn
- **Affirm Baseline (2nd Year)**
- **Annual**
  - TDS, NO3, Cl
- **Future Triennial & 5-Year Analyses**
  - Triennial Gen Min & Metals 6 SW/GW Sites
  - 5-Year Gen Min & Metals ~18 Other Sites

Groundwater Reporting

- Annual Update and Review of Monitoring Plan and Well Network
- Annual CASGEM Reporting
- Triennial Countywide Reporting

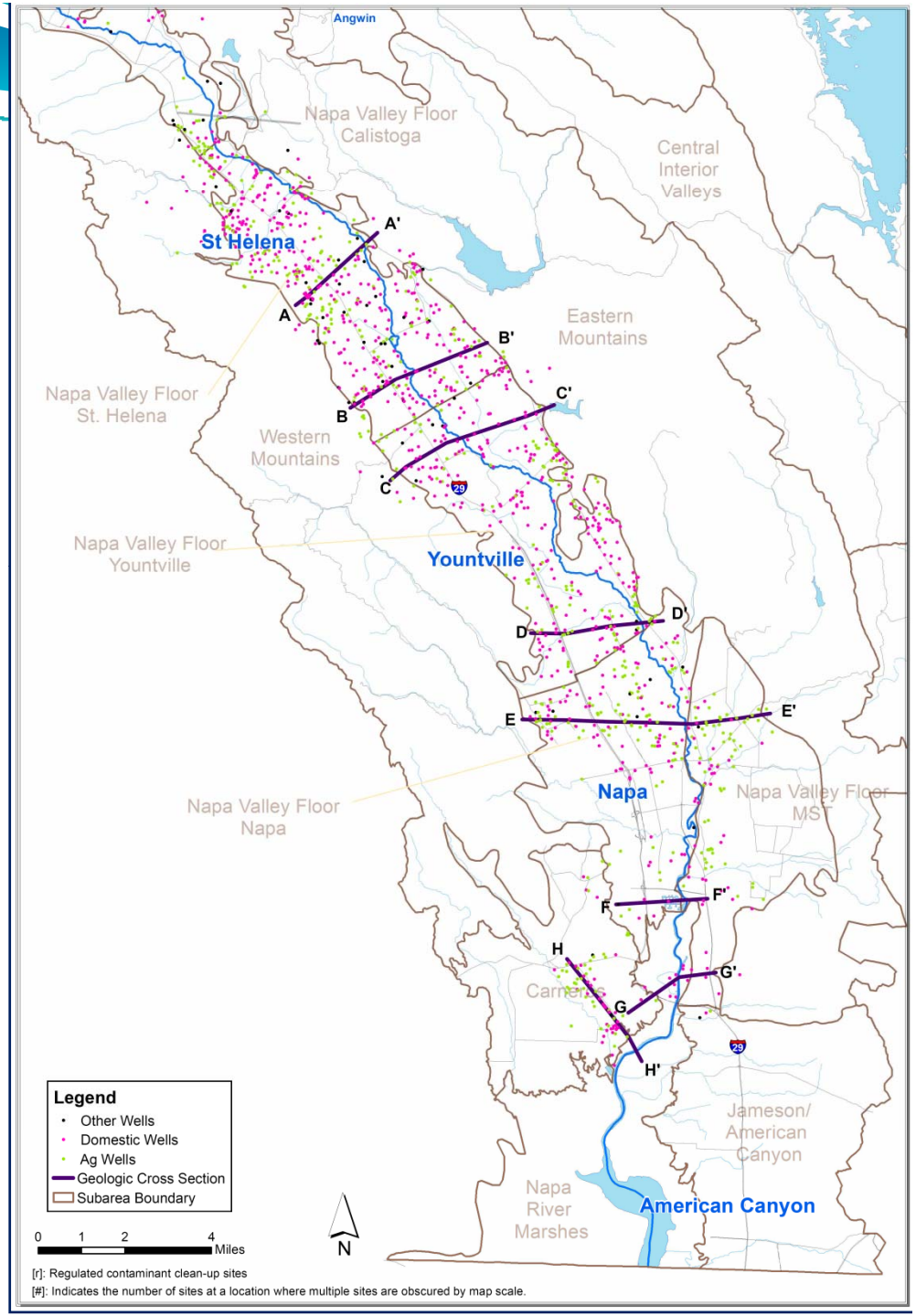
Napa County
Groundwater Monitoring Program

Next Steps

- Potential outreach in AOIs
  - AOIs in 9 of 17 County Subareas
  - Each AOI WL & WQ Monitoring
- Potential wells in AOIs

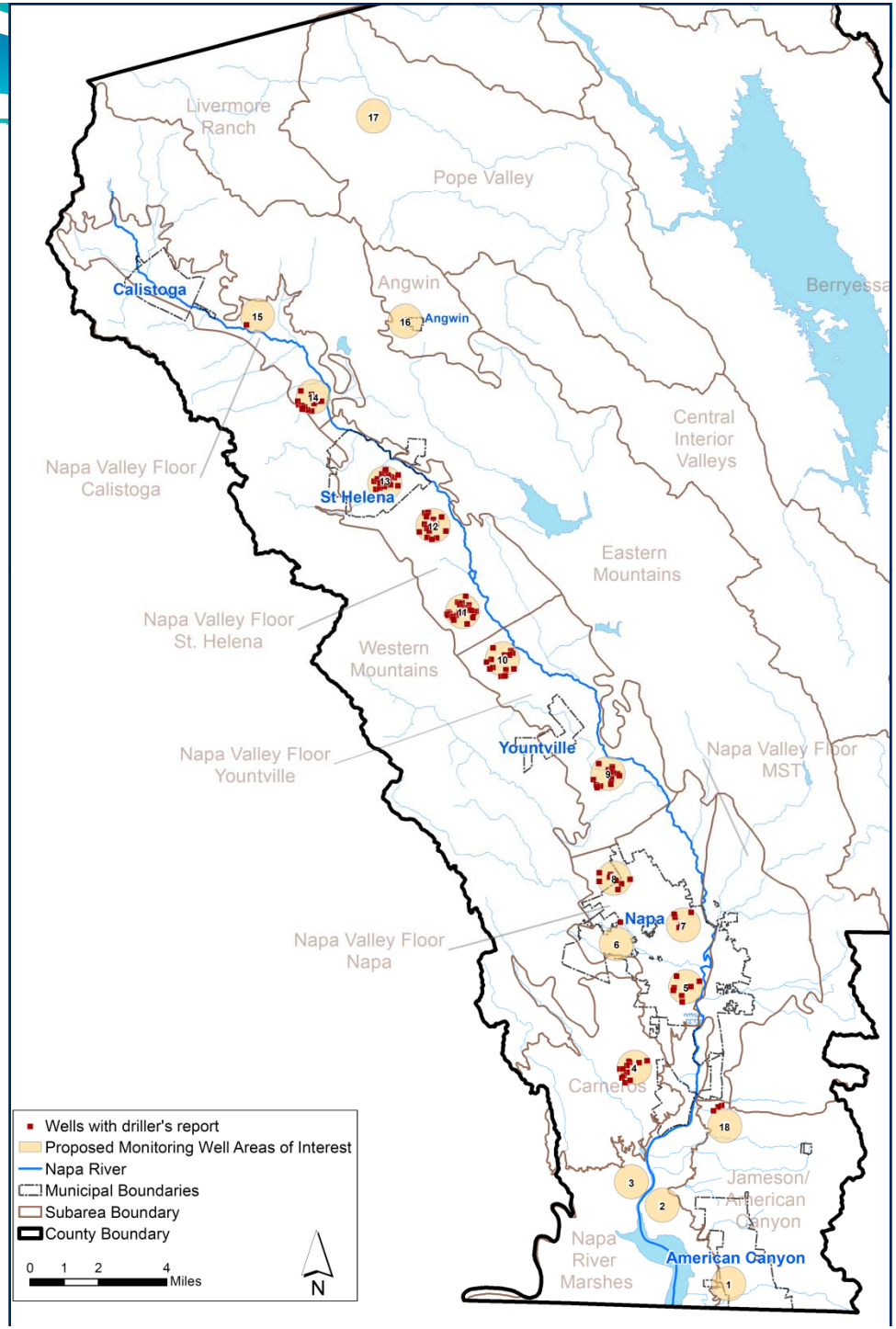
Hydrogeologic Conceptualization

- 1300 drillers' reports & boring logs
- Geologic x-sections



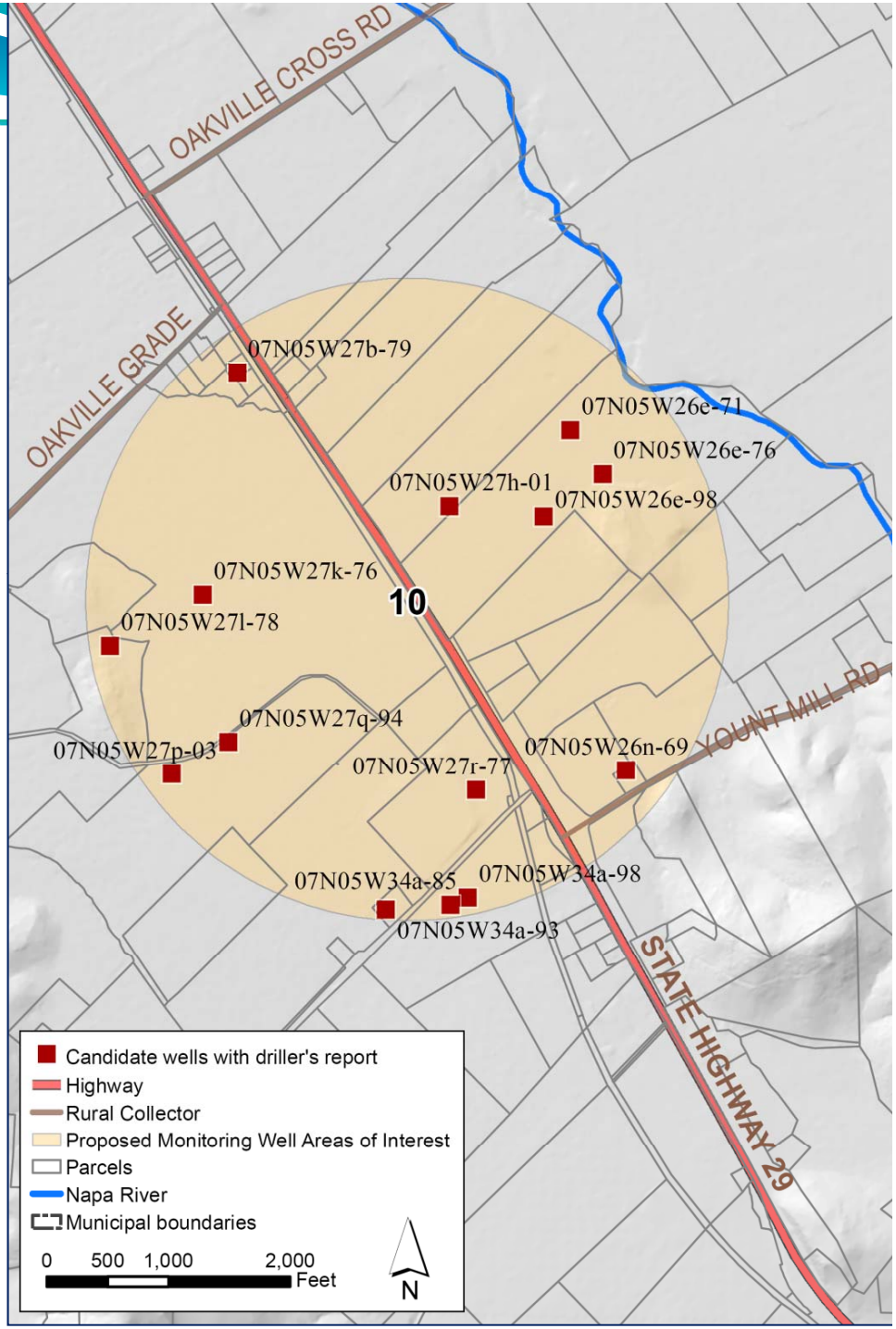
Areas of Interest

- 18 AOIs
- Coordinate with map with wells located for geologic work



Areas of Interest

- Example AOI 10
- Potential wells within 0.5 mile vicinity



Areas of Interest

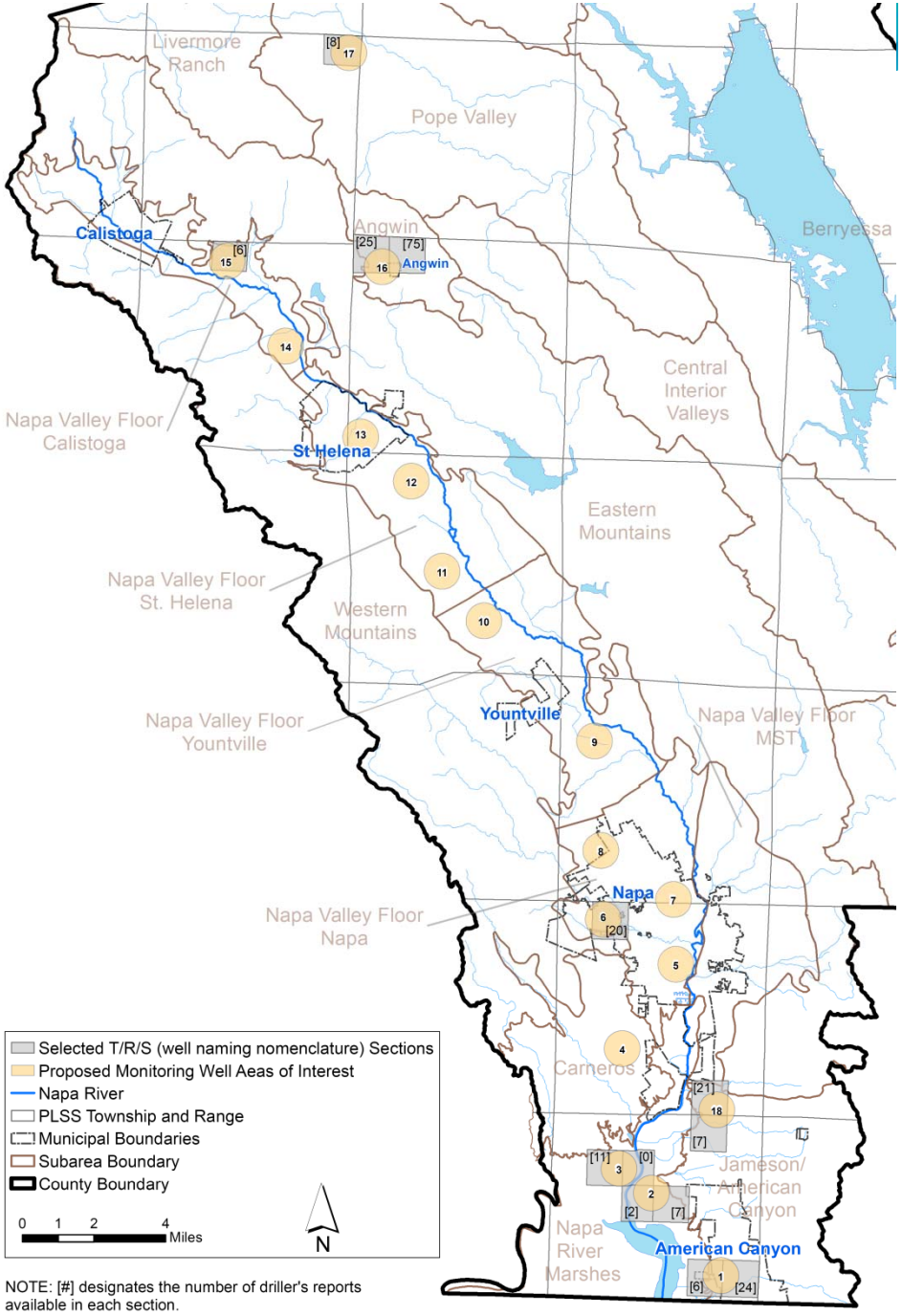
Example: Wells In Vicinity AOI 12, ~ 0.5 mile

AOI	State Well No.	Distance (ft)	Type	Type	Bore Depth	Year
12	07N05W04e-74	1977.8	D	IND	207	1974
12	07N05W04n-71	2131.6	I		215	1971
12	07N05W05g-02	2242.6	D	I	410	2002
12	07N05W05g-82	2440.1	D		250	1982
12	07N05W05g-98	1776.7	D		300	1998
12	07N05W05h-77	1099.6	D		225	1977
12	07N05W05j-71	650.3	I		300	1971
12	07N05W05k-71	1364.4	I		381	1971
12	07N05W05k-78	354.2	I		410	1978
12	07N05W05p-90	2237.4	I		515	1990
12	07N05W05q-71	960.9	I		535	1971
12	07N05W05q-75	1016.7	I		355	1975

Areas of Interest

Unlocated Wells

Subarea	AOI	No. of Wells in Vicinity of AOI
James. /Amer. Canyon	1	30
Napa River Marshes	2	9
	3	11
NVF-Napa	6	20
Calistoga	15	6
Angwin	16	100
Pope Valley	17	8
James. /Amer. Canyon	18	28



Napa County Groundwater Program

Volunteer Wells – Next Steps

- Potential wells in AOIs
  - Wells with construction info; 0.5 mile vicinity (12 AOIs)
  - Wells in nearest T/R/S (6 AOIs)
- Additional identification needs
  - Link “located” wells to current owners
  - For “unlocated” wells in 6 AOIs: physically locate the wells with drillers’ reports & link to owner

Napa County Groundwater Program

Coming Soon

- Final Groundwater Monitoring Plan
- Report on Updated Hydrogeologic Characterization & Conceptualization (Fall 2012)

Thank You

Discussion

&

Questions